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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/712,191	11/12/2003	Himanshu Pokharna	P17632	8295

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EXAMINER	
VORTMAN, ANATOLY	

ART UNIT	PAPER NUMBER
2835	

DATE MAILED: 11/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/712,191	POKHARNA ET AL.	
	Examiner	Art Unit	
	Anatoly Vortman	2835	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 October 2005 (Election)*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-44* is/are pending in the application.

4a) Of the above claim(s) *39-44* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-38* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *9/9/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Claims 39-44 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 10/04/05. The Office action on elected claims 1-38 follows:

Claim Rejections - 35 USC § 112 / 101

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1-15, 25, and 28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claims 1, 25, and 28 recite: "a freezing property of at least –10 degrees Celsius", which means: –10 degrees or more. This is not supported by the specification, which recites: "-10 degrees Celsius or below", i.e. –10 degrees or less (see p. 6, section [00024]).

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1-15 provide for the use of liquid metal coolant, of a pump, of a heat pipe, of a heat spreader, etc., but, since the claims do not set forth any steps involved in the method/process, it is unclear what method/process Applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

Claims 1-15 are rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd.* v. *Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an

international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1-6, 10-13, 15-17, 20, 22, 23, 25-28, 30, 32-35, 37, and 38, are rejected under 35 U.S.C. 102(e) as being anticipated by US/6,658,861 to Ghoshal et al., (Ghoshal) (cited on IDS).

Regarding claim 16, Ghoshal disclosed (Fig. 7) an apparatus, comprising a heat exchanger (705), and a pump (707) coupled to the heat exchanger (705) and is to enable a liquid metal coolant to flow in a tube (703) toward the heat exchanger (705), wherein the liquid metal coolant is used to cool a first component (column 8, lines 43- 44) in a computer system (column 4, lines 19-27).

Regarding claim 26, Ghoshal disclosed (Fig. 7) a system, comprising a first electronic component (column 8, lines 43- 44), a remote heat exchanger (RHE) (705) coupled to the first electronic component; and a pump (707) coupled to the first electronic component and to the RHE (705), the pump (707) is to enable a liquid metal coolant to flow toward and away from the RHE (705).

Regarding claims 17 and 37, Ghoshal disclosed that the pump (707) is a electromagnetic pump (Fig. 7).

Regarding claim 20, Ghosal disclosed that the first component is associated with a first cold plate (701) (column 8, lines 43- 44).

Regarding claims 22 and 30, Ghoshal disclosed (Fig. 7) that the liquid metal coolant is further used to cool a third component (column 8, line 50) in the computer system, the third component associated with a third cold plate (709), wherein the pump (707, 713, 715) is to enable the liquid metal coolant to flow in the tube (703, 711) to the first cold plate (701) and to the third cold plate (709) in parallel.

Regarding claims 25 and 28, as best understood, Ghoshal disclosed that liquid metal includes freezing point property of at least –10 degrees Celsius (column 5, line 61).

Regarding claim 27, Ghoshal disclosed that the liquid metal coolant is to flow toward and away from the RHE (707) in a tube (703).

Regarding claim 38, Ghoshal disclosed that the first electronic component is a processor or a graphic controller (column 4, lines 63+).

Regarding claims 23 and 32, Ghosal disclosed that a heat spreader may be connected to a component to be cooled (column 9, lines 18+).

Regarding claims 33-35, Ghoshal disclosed that the liquid metal coolant includes a mixture of Indium, Gallium, Zinc or Copper (column 5, lines 48-52).

Regarding method claims 1-6, 10-13, and 15, as best understood, the method recited in the claims is inherently necessitated by the device structure as disclosed by Ghosal.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 7, 8, 18, 19 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ghoshal in view of US/6,741,464 to Kitano et al., (Kitano) and US/5,731,954 to Cheon.

Regarding claims 18, 19, and 36, Ghoshal disclosed all, but did not explicitly specified that the heat exchanger is s single-pass or a multi-pass.

Cheon disclosed (Fig. 2) a single-pass heat exchanger (42, 48, 62) and Kitano disclosed (Fig. 1) a multi-pass heat exchanger (4).

It would have been obvious to a person of ordinary skill in the cooling art at the time the invention was made to implement the heat exchanger of Ghosal as either a single-pass or a multi-pass, according to the teachings of either Cheon or Kitano, respectively, in order to achieve a desired rate of the heat exchange (the number of passes is in direct correlation with the rate of the heat exchange due to the increased heat radiation area).

Regarding method claims 7 and 8, as best understood, the method recited in the claims is inherently necessitated by the device structure as disclosed by Ghosal in view of Cheon.

10. Claims 14, 21 and 29, are rejected under 35 U.S.C. 103(a) as being unpatentable over Ghosal in view of Cheon.

Regarding claims 21 and 29, Ghosal disclosed all (Fig. 7), including a second component to be cooled connected in parallel with the first component, but not the series connection as claimed. Further, Ghosal teaches that various modifications and various connections are within the scope of the invention (see column 9, lines 9-49), but stopped short of explicitly specifying series connection.

Cheon teaches (Fig. 1) several components to be cooled (8 and 28) connected in series in a cooling loop.

It would have been obvious to a person of ordinary skill in the cooling art in light of teachings of Ghosal and Cheon, to connect the components to be cooled of Ghosal in any desired way within a cooling loop, including in series as claimed, in order to achieve appropriate rate of the heat exchange and desired level of the efficiency of the cooling system.

Regarding method claim 14, as best understood, the method recited in the claim is inherently necessitated by the device structure as disclosed by Ghosal in view of Cheon.

11. Claims 9, 24 and 31, are rejected under 35 U.S.C. 103(a) as being unpatentable over Ghoshal taken alone.

Regarding claims 24 and 31, Ghoshal disclosed (Fig. 7) all as apply to claims 16 and 26, respectively, but did not disclose a heat pipe being employed in a system of Fig. 7. Ghosal also teaches that various modifications and various connections are within the scope of the invention (see column 9, lines 9-49), but stopped short of explicitly specifying that a heat pipe may be a part of the cooling system of Fig. 7. However, on Fig. 1 Ghoshal teaches that a heat pipe (101) may be used for removing heat from an electronic component (105).

It would have been obvious to a person of ordinary skill in the cooling art at the time the invention was made to provide the heat pipe in a system of Fig. 7 in light of teachings of Fig. 1, in order to accommodate the system of Fig. 7 for a particular application, to enhance the flexibility of the system and to augment the rate of the heat exchange.

Regarding method claim 9, as best understood, the method recited in the claim is inherently necessitated by the device structure as disclosed by Ghosal.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure: US/5006924 and 6856037 disclosed cooling loops utilizing liquid metal as a cooling medium, and US/5052472, 6137169, 6234240, 6313990, 6519146, 6550530, 6705089, and 6942018 disclosed various closed loop cooling arrangements for electronic devices.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anatoly Vortman whose telephone number is 571-272-2047. The examiner can normally be reached on Monday-Friday, between 10:00 am and 6:30 pm..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ms. Lynn Feild can be reached on 571-272-2092. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Anatoly Vortman
Primary Examiner
Art Unit 2835

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